AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims

1. (Cancelled)

2. (Currently amended) A system for maintaining zonal isolation in a wellbore, characterized in that said system comprises, within a pathway at a specific location along said wellbore, a sealing element to block said pathway, said sealing element being able to deform both during and after placement and wherein the sealing element is maintained under compression after completion of the placement, thereby urging the deformable sealing element into contact with less deformable material bounding the pathway so as to maintain a seal against fluid migration along the pathway, wherein the sealing element is a sealing ring, said sealing ring being confined in a volume surrounded by materials of high Young's modulus, greater than 1000MPa, comprising well tubing, formation surrounding the wellbore and cement injected into the wellbore, said cement injected into the wellbore comprising a first sheath portion and a second sheath portion, wherein the sealing ring comprises a sealing material which has a Young's modulus below 1000 MPa., is contained between and contacts said first sheath portion and said second portion and ~~wherein the sealing element~~ is connected to a fluid communication element adapted to supply pressurizing fluid after placement and thereby maintain pressure within at least part of the sealing element.

3. (Cancelled)

4. (Previously presented) The system of claim 2, wherein the sealing element comprises a sealing material in a solid state.

5. (Previously presented) The system of claim 2, wherein the sealing element comprises a sealing material which approximates the behaviour of an elastic solid.

6. (Previously presented) The system of claim 2, wherein the sealing element comprises a sealing material in a liquid state.

7. (Previously presented) The system of claim 2, wherein the sealing element comprises a sealing material, said sealing material being a yield stress fluid.

8. (Previously presented) The system of claim 7, wherein the yield stress value of the sealing material is greater than 10 Pa.

9. (Previously presented) The system of claim 2, wherein the sealing material is visco-plastic.

10. (Previously presented) The system of claim 2, wherein the sealing material is visco-elastic.

11. (Cancelled)

12. (Cancelled).

13. (Currently amended) The system of claim 2, wherein ~~the sealing element comprises~~ said sealing material is enclosed by an inflatable membrane.

14. (Cancelled)

15. (Cancelled)

16. (Currently amended) The system of claim ~~12~~ 2, wherein the sealing element is able to deform for more than 5 years after placement.

17. (Previously presented) The system of claim 2, wherein the sealing element is designed to deform for the planned life time of the well.

18. (Previously presented) The system of claim 2, wherein formation surrounding the wellbore comprises at least a first layer and a second layer, said first layer being essentially impermeable and said second layer being permeable and wherein the sealing element is at least partially placed adjacent to the first layer.

19. (Cancelled)

20. (Cancelled)

21. (Cancelled)

22. (Currently amended) The system of claim ~~20~~ 2, wherein the cement injected into the wellbore comprises material that expands after placement.

23. (Cancelled)

24. (Previously presented) The system of claim 2, wherein the average height of the sealing element, measured along the wellbore axis, is less than approximately 150 m.

25. (Original) The system of claim 24, wherein the average height of the sealing element, measured along the wellbore axis, is less than approximately 60 m.

26. (Original) The system of claim 25, wherein the average height of the sealing element, measured along the wellbore axis, is comprised between approximately 1 m and approximately 30 m.

27. (Previously presented) The system of claim 2, wherein the sealing element comprises a sealing material, which is sufficiently fluid prior to placement to be pumped or injected at a specific downhole location, and sets under pressure to a deformable solid or a yield stress fluid.

28. (Cancelled)

29. (Previously presented) The system of claim 27 wherein said sealing material expands during solidification or gelation.

30. (Previously presented) The system of claim 27, wherein the sealing material is maintained under compression by cement sheath portions.

31. (Previously presented) The system of claim 27, wherein the sealing element is compressed by expanded parts of a well tube.

32. (Original) The system of claim 3, wherein the sealing element consists of a chemical compound that homogenously fills the volume.

33. (Original) The system of claim 2, wherein compression results from the hydrostatic pressure of the liquid/yield fluid that forms the sealing material.

34. (Cancelled)

35. (Cancelled)

36. (Cancelled)

37. (Cancelled)

38. (Cancelled)

39. (Cancelled)

40. (Previously presented) A method of maintaining zonal isolation in a wellbore, characterized in that it comprises the following steps:

placing a sealing element at a specific location along said wellbore, said sealing element comprising a sealing material which is a liquid or a gel

allowing said sealing element to be able to deform both during and after placement;

activating said sealing material to transform to a solid or yield stress fluid, and

thereafter maintaining the sealing element under compression after completion of the placement,

wherein the activation is triggered by expansion of parts of a well tube crushing encapsulated components of the sealing material, by an external trigger, or by injection of an activator.

41. (Previously presented) The method of claim 40, wherein there is a well tube within said well bore and the sealing element is placed on the outer surface of said well tube.

42. (Previously presented) The method of claim 40, wherein the sealing element comprises an inflatable element, said inflatable element being inflated by a sealing material, in a liquid or gel state.

43. (Previously presented) The method of claim 40, wherein there is a well tube within said well bore and at least part of the sealing material is placed after placement of the well tube.

44. (Previously presented) The method of claim 43, wherein the sealing material is pumped from the surface through one or more ports in the well tube.

45. (Original) The method of claim 44, wherein the well tube comprises a valve, which is able to open or close said one or more ports.

46. (Cancelled)

47. (Cancelled)

48. (Previously presented) The method of claim 40, wherein the sealing element is pumped as part of a fluid train from the surface through a well tubing into the annulus between the well tubing and the formation.

49. (Original) The method of claim 48, wherein the sealing element is placed using a delivery tube introduced into the well tube.

50. (Cancelled)

51. (Cancelled)

52. (Previously presented) The method of claim 40, wherein an under-reaming is carried out and the sealing material is placed in the under-reamed section of the well.

53. (Cancelled)

54. (Previously presented) Use of the system according to claim 2 for plug and abandonment.

55. (Withdrawn) Wellbore fluid comprising crosslinkable polypropylene glycol adapted for injection in the well to cause the formation of a permanent barrier to isolate sections of the wellbore.

56. (Withdrawn) The wellbore fluid of claim 55 wherein the polypropylene glycol comprises epoxy groups as terminal groups.

57. (Previously presented) A system for maintaining zonal isolation in a wellbore, characterized in that said system comprises, within a pathway at a specific location along said wellbore, a sealing element to block said pathway, said sealing element being able to deform both during and after placement and wherein the sealing element is maintained under compression after completion of the placement, thereby urging the deformable sealing element into contact with less deformable material bounding the pathway so as to maintain a seal against fluid migration along the pathway, wherein the sealing element comprises a sealing material, said sealing material being a yield stress fluid and the stress value of the sealing material is greater than 600Pa.

58. (Cancelled)

59. (Previously presented) The method of claim 40 wherein said sealing material is a liquid before activation.

60. (Previously presented) The method of claim 40 wherein said sealing material is a gel before activation.

61. (Previously presented) The system of claim 57, wherein the sealing element is able to deform for at least 5 years after placement.

62. (Cancelled)

63. (Previously presented) Use of the method according to claim 40 for plug and abandonment.

64. (Cancelled)

65. (Previously presented) The method of claim 40, wherein said pathway is at least partially bounded by rock or cement.

66. (Previously presented) The method of claim 40, wherein the sealing element is confined in a volume surrounded by materials of high Young's modulus, greater than 1000MPa

67. (Previously presented) The system of claim 57, wherein the sealing element is confined in a volume surrounded by materials of high Young's modulus, greater than 1000MPa.

68. (Previously presented) The system of claim 57, wherein the sealing element is confined in a volume formed by well tubing, formation surrounding the wellbore and cement injected into the wellbore.

69. (Previously presented) The system of claim 57, wherein the sealing material is sufficiently fluid prior to placement to be pumped or injected at a specific downhole location, and sets under pressure to a yield stress fluid.

70. (Previously presented) Use of the system according to claim 57 for plug and abandonment.

71. (Previously presented) A system for maintaining zonal isolation in a wellbore, characterized in that said system comprises, within a pathway at a specific location along said wellbore, a sealing element to block said pathway, said sealing element being able to deform both during and after placement and wherein the sealing element is maintained under compression after completion of the placement, thereby urging the deformable sealing element into contact with less deformable material bounding the pathway so as to maintain a seal against fluid migration along the pathway, wherein the sealing element is composite and comprises a first material which is a yield stress fluid and forms a continuous phase and a second material which is solid and forms a discontinuous phase intermingled with the continuous phase first material.

72. (Previously presented) The system of claim 71, wherein the sealing element is confined in a volume surrounded by materials of high Young's modulus, greater than 1000MPa.

73. (Previously presented) The system of claim 71, wherein the sealing element is confined in a volume formed by well tubing, formation surrounding the wellbore and cement injected into the wellbore.

74. (Previously presented) The system of claim 71, wherein the yield stress value of the sealing material is greater than 10 Pa.

75. (Previously presented) The system of claim 71, wherein the sealing material is sufficiently fluid prior to placement to be pumped or injected at a specific downhole location, and sets under pressure to a yield stress fluid.

76. (Previously presented) The system of claim 71, wherein the sealing element is able to deform for at least 5 years after placement.

77. (Previously presented) Use of the system according to claim 71 for plug and abandonment.